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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/622,307 | 07/18/2003 | Randy Skocypec | ITL.1017US (P16704) | 4356 |
| 21906 | 7590 | 08/24/2006 | EXAMINER | |
| TROP PRUNER & HU, PC 1616 S. VOSS ROAD, SUITE 750 HOUSTON, TX 77057-2631 | | | CARRILLO, BIBI SHARIDAN | |
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1746

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/622,307

Applicant(s)

SKOCYPEC ET AL.

Examiner

Sharidan Carrillo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-19 is/are pending in the application.
- 4a) Of the above claim(s) 9-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-3 and 5-17 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Brown et al. (US2002/0121289A1).

Brown et al. teach positioning a wafer between a pair of rotating brushes 13, 15 and spraying a solution at the interface between the brushes and wafer while the brushes are in contact with the wafer. Paragraph 25 teaches the spray bar directing fluid to a desired location (i.e. a substrate, scrubber brush, air/substrate interface, air/substrate/cleaning fluid interface, air/substrate/rinsing fluid interface). Paragraph 5 teaches directing the fluid by nozzles 21 to the brushes and/or substrate S. In reference to claim 1, the limitations of providing a cleaning solution through at least one of the brushes are inherently met as a result of the spray bar spraying the brush, as illustrated in Fig. 4. In reference to claim 1, the limitations are inherently met since the brushes appear to be porous because of the holes on the brushes, as illustrated by Fig. 4. In reference to claim 2, Fig. 4 shows the cleaning solution being sprayed at the center of the brushes. Additionally, paragraph 47 teaches that an additional spray bar may be employed to deliver fluid to the brush 15. In reference to claim 3, refer to paragraph 26. In reference to claim 5, refer to Fig. 4. In reference to claim 6, refer to paragraph 36. In

reference to claim 7, Brown teaches in paragraph 37 a second spray bar assembly for directing fluid towards a desired location.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (US2002/0121289A1) in view of Mikhaylichenko et al. (6951042).

Brown teaches the invention substantially as claimed with the exception of the limitations of claim 8. Mikhaylichenko teaches cleaning a substrate by brush scrubbing in order to effectively clean the wafer after chemical mechanical polishing (col. 11, lines 44-65). Mikhaylichenko further teaches brush scrubbing both sides of the wafer by convention methods, which include applying fluid through the brush core as illustrated in Fig. 5a. Fig. 2e teaches applying a solution via nozzle 127 as the wafer is scrubbed by rotating brush 112. In col. 11, lines 45-65, Mikhaylichenko teaches using various fluid mediums to remove contaminants present on the wafer surface after chemical mechanical polishing.

It would have been obvious and within the level of the skilled artisan to modify the method of Brown to include cleaning after CMP, as taught by Mikhaylichenko, for purposes of removing contaminants from the substrate surface.

6. Claim 1-3 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (US2002/0121289A1) in view of Mikhaylichenko et al. (6951042).

Brown et al. teach positioning a wafer between a pair of rotating brushes 13, 15 and spraying a solution at the interface between the brushes and wafer while the brushes are in contact with the wafer. Paragraph 25 teaches the spray bar directing fluid to a desired location (i.e. a substrate, scrubber brush, air/substrate interface, air/substrate/cleaning fluid interface, air/substrate/rinsing fluid interface). Paragraph 5 teaches directing the fluid by nozzles 21 to the brushes and/or substrate S. In reference

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to claim 1, the limitations of providing a cleaning solution through at least one of the brushes are inherently met as a result of the spray bar spraying the brush, as illustrated in Fig. 4.

In the alternative that Brown et al. do not teach providing the cleaning solution through at least one of the brushes, the limitations are met by the secondary reference of Mikhaylichenko et al. Brown et al. teach PVA brushes. In Fig. 5a, Mikhaylichenko teaches the use of PVA brushes (i.e. sponge brushes) having a plurality of openings 212d for applying cleaning solution to the rotating wafers in order to dislodge and remove contaminants from the substrate surface (col. 11, lines 20-25, 40-45). It would have been obvious to a person of ordinary skill in the art to have modified the PVA brushes of Brown, to include PVA sponge brushes, as taught by Mikhaylichenko, for purposes of applying cleaning solution to the rotating wafer in order to further remove and dislodge contaminants from the wafer surface.

In reference to claim 2, Fig. 4 shows the cleaning solution being sprayed at the center of the brushes. Additionally, paragraph 47 teaches that an additional spray bar may be employed to deliver fluid to the brush 15. In reference to claim 3, refer to paragraph 26. In reference to claim 5, refer to Fig. 4. In reference to claim 6, refer to paragraph 36. In reference to claim 7, Brown teaches in paragraph 37 a second spray bar assembly for directing fluid towards a desired location.

Brown teaches the invention substantially as claimed with the exception of the limitations of claim 8. Mikhaylichenko teaches cleaning a substrate by brush scrubbing in order to effectively clean the wafer after chemical mechanical polishing (col. 11, lines

44-65). Mikhaylichenko further teaches brush scrubbing both sides of the wafer by convention methods, which include applying fluid through the brush core as illustrated in Fig. 5a. Fig. 2e teaches applying a solution via nozzle 127 as the wafer is scrubbed by rotating brush 112. In col. 11, lines 45-65, Mikhaylichenko teaches using various fluid mediums to remove contaminants present on the wafer surface after chemical mechanical polishing.

It would have been obvious and within the level of the skilled artisan to modify the method of Brown to include cleaning after CMP, as taught by Mikhaylichenko, for purposes of removing contaminants from the substrate surface.

Response to Arguments

7. Applicant argues that PVA brushes of Brown cannot provide cleaning solution through at least one of the brushes because a PVA brush is a nylon-like plastic material. Applicant's arguments are unpersuasive for the following reasons. In reference to claim 1, the limitations are inherently met since the brushes appear to be porous because of the holes on the brushes, as illustrated by Fig. 4. In the alternative that Brown et al. do not teach providing the cleaning solution through at least one of the brushes, the limitations are met by the secondary reference of Mikhaylichenko et al. Brown et al. teach PVA brushes. In Fig. 5a, Mikhaylichenko teaches the use of PVA brushes (i.e. sponge brushes) having a plurality of openings 212d for applying cleaning solution to the rotating wafers in order to dislodge and remove contaminants from the substrate surface (col. 11, lines 20-25, 40-45). It would have been obvious to a person of

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ordinary skill in the art to have modified the PVA brushes of Brown, to include PVA sponge brushes, as taught by Mikhaylichenko, for purposes of applying cleaning solution to the rotating wafer in order to further remove and dislodge contaminants from the wafer surface. Additionally, there is no suggestion or teaching that the PVA brush of Brown et al. is a nylon like plastic material unable to flow cleaning solution throughout. In the semiconductor art, it is well known to use PVA sponge brushes of apply cleaning solution to the wafer surface to further remove contaminants, as evidenced by deLarios et al. (5810126). Therefore, since Brown et al. is cleaning wafers by scrubbing with PVA brushes, one would reasonably expect the PVA brushes to be made of a sponge material having openings for delivery of the cleaning solution.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharidan Carrillo whose telephone number is 571-272-1297. The examiner can normally be reached on M-W 6:30-4:00pm, alternating Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

b5c



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